

**ABSTRACT OF THE DISCLOSURE****INTEGRATED QUANTUM COLD POINT COOLERS**

A method for forming a thermoelement for a thermoelectric cooler is provided. In one embodiment a first substrate having a plurality of pointed tips separated by valleys wherein the substrate is covered by a metallic layer, portions of the metallic layer is covered by an insulator, and other portions of the metallic layer are exposed is formed. The other portions of the metallic layer that are exposed are covered with a thermoelectric material overcoat. A second substrate of thermoelectric material is then fused to the pointed tip side of the first substrate by, for example, heating the back of the first substrate to melt the thermoelectric material overcoat or by passing current through the pointed tips to induce Joule heating and thereby melt the thermoelectric material overcoat.